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| 10/728,733 | 12/05/2003 | Eric M. Rohrbaugh | 2507-6021US (22029-US) | 1717 |

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| EXAMINER |
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RODRIGUEZ, WILLIAM H

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| ART UNIT | PAPER NUMBER |
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3746

| SHORTENED STATUTORY PERIOD OF RESPONSE | MAIL DATE | DELIVERY MODE |
|--|------------|---------------|
| 3 MONTHS | 01/03/2007 | PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/728,733

Applicant(s)

ROHRBAUGH ET AL.

Examiner

William H. Rodriguez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2006.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-18,20-35,40,42,43 and 45-55 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-18,22-31,34,35,42,43,45,46 and 50-55 is/are rejected.
- 7) ☒ Claim(s) 20,21,32,33 and 47-49 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to the amendment and remarks filed 10/19/06. Since the examiner has applied new grounds of rejection, this office action is being made non-final to afford the applicant the opportunity to respond to the new grounds of rejection. Also, the indicated allowability of claims 50 and 51 is withdrawn in view of the newly discovered reference(s) to **LeFebvre (US 3,999,379)**; **Maes (US 3,532,297)** and **McDonald (US 3,724,217)**. Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 42, 43, 46 and 51 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 42 is rejected because the description fails to enable how to size the maneuver control valves to effect rapid depressurization. Appropriate correction is required.

Regarding claim 43, if the state wherein the axial thrust valve is open and the maneuver control valves are closed permits combustion, and the further opening of all maneuver control valves causes combustion termination, then the opening of the axial valve and only one maneuver valve should permit a much lower combustion, in contradiction with the claim that the

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lowest combustion rate occurs only when the axial thrust valve is open and the maneuver control valves are all closed. Appropriate correction is required.

Claims 46 and 51 are rejected because the description fails to enable how to modulate the flow area (the enablement - not the idea) in order to compensate for temperature effects of the grain. Appropriate correction is required.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1, 25, 29, 42 and 52-55 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In the claims mentioned above, the recitation “rapidly reduce pressureto substantially extinguish combustion...” are desired results that may be obtained if the valves are operated in a certain way. If the valves are not operated at all, then the desired results never take place. These desired results do not serve to distinguish the invention over a prior art reference satisfying the structural limitations (a pressure vessel, a solid propellant, and a plurality of valves) and thus these are not given patentable weight. Moreover, rapid depressurization of a combustion chamber of solid propellant rocket motors is a well-known technique to extinguish the combustion process (See cl. 1 ll. 38-42 of US 3,999,379; cl. 4 ll. 7-8 of US 6,250,072 just to name a few references). Therefore, in fact the recited desired results are not even an inventive feature of the invention.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 25 is rejected under 35 U.S.C. 102(b) as being anticipated by **McDonald (US 3,724,217)**.

McDonald (Figure 1) teaches a propulsion system, comprising: a pressure vessel (2 or 11) containing a solid propellant (3 and 4 or 19 and 20); and a plurality of valves (6, 14, 16, 23) in communication with the vessel(s), wherein by opening a plurality of valves (6 or 23 or both) causes rapid depressurization of the combustion chamber to extinguish the solid propellant (cl. 2 ll. 49-52). Since **McDonald** has the same structure as claimed, it is inherent that **McDonald's** device would be able to perform the recited method steps.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 3-18, 22-31, 34, 35, 42, 43, 45, 46 and 50-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Denoel et al. (US 5,765,367)** in view of **LeFebvre (US 3,999,379)**.

Denoel (particularly Figure 1) teaches a system comprising a pressure vessel 10 containing a solid propellant 14, an axial thrust valve 40 for exhausting the combustion gases generated by the combustion of the solid propellant and a plurality of maneuver control valves 34_1, 34_2 or 34_3 each in communication with a thruster, at least two of the thrusters located in a common plane transverse to the longitudinal axis, an igniter (not shown but inherent to start combustion of propellant), wherein the pressure vessel, the axial and the maneuver valves are disposed within the space vehicle housing “common housing”. **Denoel** is silent about the technique used in his invention for extinguishing the solid propellant. However, **Lefebvre** (cl. 1 ll. 35-42) teaches that in solid propellant rocket motors (as the one claimed by **Denoel**) rapid depressurization of the combustion chamber was a well-known and typical technique used to extinguish the combustion process of a solid propellant. In **Denoel**, one of ordinary skill in the art would have realized/understood that in order to rapidly depressurize the combustion chamber 12 both the axial valve 40 and maneuver valves simultaneously need to be open. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the teachings of **LeFebvre** and have controlled simultaneously and in combination the axial and maneuver valves in order to rapidly depressurized the combustion chamber so as to extinguish the solid propellant.

With regards to the limitations “four maneuver control valves, eight maneuver control valves, plurality of igniters” that **Denoel** fails to teach, it has been held *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) that mere duplication of parts has no patentable significance unless a new and unexpected result is produced, see MPEP 2144.04 VIB.

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10. Claims 1, 3-18, 22-31, 34, 35, 42, 43, 45, 46 and 50-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Maes (US 3,532,297)** in view of **McDonald (US 3,724,217)**.

Maes (particularly Figure 1) teaches a propulsion system comprising a pressure vessel 10 containing a solid propellant 12, a plurality of maneuver control valves (16, 18, 20 22) each in communication with a thruster (26, 28, 30, 32), at least two of the thrusters located in a common plane transverse to the longitudinal axis, an igniter (not shown but inherent to start combustion of propellant), wherein the pressure vessel and the maneuver valves are disposed within the space vehicle housing "common housing". **Maes** does not teach an axial thrust valve. However, **McDonald** (particularly Figure 1) teaches a propulsion system having an axial valve for creating thrust in an axial direction. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the teachings of McDonald and have added an axial thrust valve to Maes propulsion system in order to provide Maes system with greater control of the solid propellant rocket regarding direction, velocity, and attitude of the vehicle. Moreover, **McDonald** (cl. 2 ll. 15-16; and cl. 2 ll. 49-52) teaches that in solid propellant rocket motors rapid depressurization of the combustion chamber was a well-known and typical technique used to extinguish the combustion process of a solid propellant. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have controlled simultaneously and in combination the axial and maneuver valves in order to rapidly depressurized the combustion chamber so as to extinguish the solid propellant.

With regards to the limitations "eight maneuver control valves, plurality of igniters" that **Maes** fails to teach, it has been held *In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960)

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that mere duplication of parts has no patentable significance unless a new and unexpected result is produced, see MPEP 2144.04 VIB.

Allowable Subject Matter

11. Claims 20, 21, 32, 33, 47-49 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

10. Applicant's arguments with respect to claims 1, 3-18, 22-31, 34, 35, 42, 43, 45, 46 and 50-55 have been considered but are moot in view of the new ground(s) of rejection. See detailed rejections above.

12. The indicated allowability of claims 50 and 51 is withdrawn in view of the newly discovered reference(s) to **LeFebvre (US 3,999,379)**; **Maes (US 3,532,297)** and **McDonald (US 3,724,217)**. See rejections based on the newly cited reference(s) above.


Contact information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William H. Rodríguez whose telephone number is 571-272-4831. The examiner can normally be reached on Monday-Friday 7:30 am to 5:00 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ehud Gartenberg can be reached on 571-272-4828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


William H. Rodriguez
Primary Examiner
Art Unit 3746

12/14/06